CLAIMS

What is claimed is:

1. A variable speed transmission arrangement comprising a central shaft (4) which extends through a traction wheel (7-1) of an infinitely variable toroidal drive (8), said traction wheel (7-1) having a traction surface (6) on one end face (5), a summing gear set (12) with a planet carrier disposed adjacent said variable toroidal drive (8), said central shaft (4) being connected at its shaft end (10) adjacent the other end face (9) of the traction wheel (7-1) to the planet carrier (11-1) of said summing gear set (12) for rotation with the planet carrier (11-1), said traction wheel (7-1) and said planet carrier (11-1) being also joined for concurrent rotation, said traction wheel (7-1) having on its outer circumference an axial toothing (14-1) and the planet carrier (11-1) having a corresponding inner axial toothing (15-1) in engagement with the toothing (14-1) on said traction wheel (7-1).

2. A variable speed transmission arrangement according to claim 1, wherein said central shaft (4) extends through a second traction wheel (17) of the toroidal drive (8), which second traction wheel (17) is arranged, with respect to its toroidal traction surface (6), mirror-symmetrically to the first traction wheel (7-1) of the toroidal drive (8), and the second traction wheel (17) of the toroidal drive (8) is received axially displaceably in an annular cylinder (18)

which is disposed at an end of said shaft (4), said second traction wheel (17) having at its outer circumference an axial toothing (14-1), and the annular cylinder (18) being provided with a corresponding circumferential inner axial toothing (15-1), by which the outer axial toothing (14-1) of the second central wheel (17) of the toroidal drive (8) is engaged for rotation with the annular cylinder (18) while being axially displaceable.

3. A variable speed transmission arrangement according to claim 1, wherein the planet carrier (11-1, 11-2, 11-3) is connected to the associated shaft end (10) of the central shaft (4) by a weld (27).

4. A variable speed transmission arrangement according to claim 1, wherein said planet carrier (11-1 or 11-2 or 11-3), includes bearing bolts (23) for the mounting of planet wheels (30), and the planet carrier (11-1, 11-2, 11-3) and the first central wheel (7-1, 7-2, 7-3) of the toroidal drive (8) have, on their adjacent end faces (19 and 9), corresponding axial bearing surfaces (21 and 20), the effective outside diameter (22) of which is at most equal to a reference value which corresponds to the pitch diameter (24) of the arrangements of the bearing bolts (23) on the planet carrier (11-1, 11-2, 11-3), reduced by the diameter (25) of the bearing bolts (23).

5. A variable speed transmission arrangement according to claim 2, wherein said central shaft (4) extends with radial clearance, through the second traction wheel (17) of the toroidal drive (8), which second traction wheel (17) is ar-

ranged, with respect to its toroidal friction surface (6), mirror-symmetrically to the first traction wheel (7-1 or 7-2 or 7-3), that is connected directly to the planet carrier (11-1 or 11-2 or 11-3), of the toroidal drive (8), said second traction wheel (17) of the toroidal drive (8) being received in an annular cylinder (18) firmly connected to the central shaft (4), and a roller bearing (26), which allows relative movements in the direction of rotation and the axial direction, is disposed between the central shaft (4) and the second traction wheel (17) of the toroidal drive (8), said traction wheel (17) being engaged by said cylinder (18) so as to permit axial movement but not rotational movement relative thereto.

6. A variable speed transmission arrangement according to claim 2, including a central shaft (4) which passes with radial clearance through a drive-side traction wheel (7-1 or 7-2 or 7-3) of an infinitely variable toroidal drive (8), said traction wheel having a toroidal traction surface (6) on one end face (5), and being connected at its shaft end (10) adjacent the other end face (9) of the drive-side traction wheel (7-1 or 7-2 or 7-3), of the toroidal drive (8), to a planet carrier (11-1, 11-2, 11-3) of a summing gear set (12) of the planet wheel type for rotation with the planet carrier (11-1), a direct drive connection (13-1 or 13-2 or 13-3) being provided between the drive-side traction wheel (7-1 or 7-2 or 7-3) of the toroidal drive (8) and the planet carrier (11-1 or 11-2 or 11-3), said central shaft (4) extending, with radial clearance, between its shaft ends (10 and 16), through an output-side traction wheel (28), which has a toroidal traction surface (6) on

its end face facing the drive-side traction wheel (7-1 or 7-2 or 7-3) of the toroidal drive (8) and which is connected for of rotation with a sun wheel (31) of the summing gear set (12) by means of an intermediate shaft (29) concentric to the central shaft (4) and passing with radial clearance through the drive-side traction wheel (7-1, 7-2, 7-3) of the toroidal drive (8), said intermediate shaft being arranged axially displaceably in relation to one of the traction and sun wheels (28 and 31) mounted thereon for rotation therewith.

7. An arrangement according to claim 6, wherein the sun wheel (31) of the summing gear set (12) is axially displaceably supported on the intermediate shaft (29).

8. A variable speed transmission arrangement according to claim 7, wherein, for the rotationally fixed and axially displaceable arrangement of the intermediate shaft (29) in relation to the sun wheel (31), intermediate coupling members in the form of rolling balls (32) are provided, which are disposed in two opposite axial coupling grooves (33 and 34), of which one is associated with the intermediate shaft (29) and the other with the sun wheel (31).

9. A variable speed transmission arrangement according to claim 8, wherein the sun wheel (31) of the summing gear set (12) is axially supported, with respect to the planet carrier (11-1, 11-2, 11-3) and the drive side traction wheel (7-1 or 7-2 or 7-3) of the toroidal drive (8), by means of axial thrust bearings (36, 37).

10. An arrangement as claimed in claim 6, wherein the intermediate shaft (29) has on its outer circumference axial toothings (38 and 33) for rotationally fixed connection with the output traction wheel (28) and sun wheel (31).

11. A variable speed transmission arrangement according to claim 6, wherein axial securing means (39, 40) are arranged releasably, but captively, between the output traction wheel (28) and the intermediate shaft (29).

12. A variable speed transmission arrangement according to claim 6, wherein the output traction wheel (28) is shrink-fitted onto the intermediate shaft (29).

13. A variable speed transmission arrangement according to claim 1, wherein the shaft end (10), which is connected to the planet carrier (11-1 or 11-2 or 11-3), of the central shaft (4) is supported, with respect to a bearing bush (42) of a transmission housing by means of a radial bearing (41).

14. A variable speed transmission arrangement with a central shaft (4) which extends through a drive-side traction wheel (7-2) of an infinitely variable toroidal drive (8), said traction wheel (7-2) having a toroidal traction surface (6) on one end face (5), and being connected at its shaft end (10) adjacent to the other end face (9) of the traction wheel (7-2), to a planet carrier (11-2) of a summing gear set (12) for rotation with the planet carrier (11-2), said drive-side traction wheel (7-2) of the toroidal drive (8) having at its end face (9) facing the

planet carrier (11-2), an axial hub extension (43) with an inner axial toothing (14-2), and the planet carrier (11-2) has, at its end face (19) facing the drive-side traction wheel (7-2) of the toroidal drive (8), an annular web part (44) disposed radially inside the bearing bolts (23) of the planet wheels (30) and having an outer axial toothing (15-2) in engagement with the axial toothing (14-2) of said axial hub extension (43).

15. A variable speed transmission arrangement with a central shaft (4) which extends through a drive-side traction wheel (7-3) of an infinitely variable toroidal drive (8), said traction wheel (7-3) having a toroidal traction surface (6) on one end face (5), and being connected, at its shaft end (10) adjacent to the other end face (9) of the traction wheel (7-3), to a planet carrier (11-3) of a planetary-type summing gear set (12) for rotation with the planet carrier (11-3), said drive-side traction wheel (7-3) of the toroidal drive, said planet carrier including at least one bearing bolt (23) rotatably supporting a planet wheel, said at least one bearing bolt (23) having at its bolt end facing the drive-side traction wheel (7-3) of the toroidal drive (8), an axial extension forming an end-face coupling pin (45), and the drive-side traction wheel (7-3) of the toroidal drive (8) having at its end face (9) facing the planet carrier (11-3), an axial recess (46) receiving said coupling pin (45), so as to provide for rotational engagement between said traction wheel (7-3) and said planet carrier (11-3)